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(71) Applicant: KONINKLIJKE PHILIPS ELECTRONICS N.V. [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).

(71) Applicant *(for SE only)*: PHILIPS AB [SE/SE]; Kottbygatan 7, Kista, S-164 85 Stockholm (SE).

(72) Inventor: KINGHORN, John, Ritchie; Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).

(74) Agent: ANDREWS, Arthur, S.; Internationaal Octrooibureau B.V., P.O. Box 220, NL-5600 AE Eindhoven (NL).

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(57) Abstract

A pre-recorded VHS video tape has teletext data multiplexed with the video signal. The teletext data is encoded into a multilevel, for example four level, code at a reduced data rate so that it falls within the bandwith of a VHS recorder. The recorder includes a decoding circuit which takes the multilevel code and converts it to binary data. The binary data is then encoded into standard teletext packets for acquisition by a standard teletext decoder in a TV set. The teletext data is updated as the tape is played so that a given teletext page contains different data at different points along the tape. A number of creative programme applications are disclosed.

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DESCRIPTION

VIDEO TAPE AND APPARATUS FOR PLAYING SUCH A VIDEO TAPE

The invention relates to a VHS video tape and to a tape player for playing such a video tape.

Our co-pending UK Patent Application No. 9605614.8 (PHB 34056) discloses a method of recording teletext data on VHS tape and replaying the data when the tape is replayed. It is well known that current VHS recorders cannot record and replay teletext signals reliably as the data rate of the teletext signal is too high for the bandwidth of the standard VHS video recorder. The above referenced patent application describes a system in which the teletext data is recorded on the tape as a multilevel code having a data rate less than that of the standard teletext data. In a particular example the multilevel code has four amplitude levels and two bits of the teletext data received are combined into one data period of the multilevel code. Thus the data rate is effectively halved bringing it within the bandwidth of a standard VHS video recorder.

It is an object of the invention to enable the provision of new services for a viewer who is equipped with a video recorder having a teletext playback facility and a television receiver capable of displaying a teletext page.

The invention provides a VHS video tape carrying thereon teletext data multiplexed with a video signal, the teletext data being encoded into a multilevel code having a data rate less than that of a standard broadcast teletext signal and within the bandwidth of a VHS standard video recorder, in which the teletext data is relevant to the material on the tape and on a given teletext page is updated along the length of the tape.

A conventional teletext data base as transmitted by a broadcaster contains the same information repeatedly transmitted in a cycle. After around

20 seconds the cycle is repeated. There may be different versions of some pages on the next cycle (rolling pages) but after several cycles all versions of those pages are cycled through and the information is repeated. For news items and other information there may be periodic updates during the day but in general the information is static and not related in any way to the TV programme content on the particular channel with which the teletext signal is being transmitted.

It has been recognised that for a prerecorded tape the contents of a programme recorded on the tape are known to the provider before it is recorded on the tape. It has further been recognised that this offers the possibility of tailoring the teletext information to the video material. This enables the media producer to construct the teletext data base in a new way which causes the information to change dynamically during the playing of the tape.

The teletext data base can be constructed by the media producer using the standard teletext generation equipment but with the difference that the teletext page origination equipment is linked into the video master playback equipment. Time codes from the master video source can be used to initiate the insertion of different teletext page data under the control of the editor. This makes it possible to change the content of the teletext data base during the recording of the tapes for distribution. When a particular page is selected by the viewer on playback of the tape, the information content will change depending on which part of the tape is being played back at the time. This allows a number of creative possibilities.

A first example is of an otherwise conventional video tape conveying a film of a detective story. Part of the conventional teletext data base fixed for the duration of the tape is an index page or pages describing the various teletext services provided. Each of these services will normally be allocated a page or group of pages. One or more of these pages or groups of pages could be the "plot so far". When the tape is first played, little has happened in the drama and there would not be much information on this page. As time

progresses and significant events happen in the story they are described in text and added to the "plot so far" page. By the end of the tape the "plot so far" page or pages would contain a summary of all the major events in the drama. As a result a viewer playing the tape at an intermediate point along its length, perhaps returning to it after a break of several days could call up the "plot so far" page and have a quick overview as a reminder of the action. Thus if viewing of the film has been interrupted it is not necessary for the viewer to wind the tape back to the beginning to recall what has happened up to date but rather the viewer can start playing the tape from the position where the viewing was interrupted and call up the "plot so far" page to provide a reminder enabling the viewer to enjoy the remainder of the film.

A second example, perhaps particularly appropriate in the case of a detective story, is to have different pages representing the events according to the perspective of different characters in the drama. A particular page could be selected from the index such as "Mr Brown's impressions". This page would be updated from time to time with events in the story as seen through Mr Brown's eyes. As different characters have different involvement in the story and different perceptions this could provide not only entertainment for those who like this kind of detective puzzle but could provide penetrating insights into character's impressions and motivations. In the tradition of good detective stories, false clues and misinterpretations could be added to give confusion.

A third example enhances the above possibilities by using a newsflash type technique. As is known from broadcast television rather than the information being displayed as a complete teletext page instead of the TV picture it can be added to the video material so that the text is displayed in a box superimposed on the TV picture. The teletext data is transmitted as a news flash page which switches on the TV picture and only characters within the box are displayed. The size shape and position of the box can be altered to suit the video material, dynamically if required. Examples of the creative use of this technique include cartoon style speech bubbles associated with characters on the TV picture or selective blanking of significant parts of the

picture with a box, for example a box containing text of Inspector Le Plodd's thoughts conceals the murder weapon. Another use is to prompt the viewer to look at a selected object or person within a picture; the newsflash could say "look who is hiding behind this tree".

A fourth example of dynamically changing teletext could be the use in quizzes and puzzles for educational as well as entertainment material. Some video material is presented outlining a particular situation and then a particular teletext page appears asking questions based on the video material or on a similar topic to the video material with multiple choice answers. The viewer thinks about the question and selects the chosen answer either by selecting a particular page number or pressing a coloured key as in the Fastext or TOP modes. If the question is answered within the time limit the answer page defines the answer as right or wrong and presents any other information which may be desired. If, however, the time is exceeded the data on the answer pages changes to something like "out of time" and has associated with it different pointers. In a short time a comprehensive set of questions and answers with a real interactive feel can be created. Of course the data base is not truly interactive, but it gives an interactive feel to the viewer because all possible answers to questions are recorded on the tape and it changes with time in a dynamic way. In this respect time is equated with position on the tape and although this is not absolute time, i.e. it does not coincide with a particular time of day, it does correspond with elapsed time from the start of playing the tape.

The data may be presented as full pages without the video information or may replace the video for a certain duration. Alternatively it may be mixed with the video in a box as required or superimposed on the video as with the known mixed node in normal teletext transmission. In addition to text, graphics can be used dynamically to create special effects, such as to reveal progressively part of a picture. Thus in a quiz where the question is to identify a particular person, portions of that person can be progressively revealed, the marks allocated to the viewer depending on how much of the person has to be

revealed before the viewer can guess who the person is.

A further example of this technique is for producing a product catalogue using such a tape. Thus a picture of a product may be displayed and while the picture is being displayed selected teletext pages giving further information such as prices, local dealers, product specifications and any other relevant information can be made available. These teletext pages need not be present throughout the tape as they would naturally only be accessed during or immediately after the video material for the corresponding product. So different parts of the tape will contain different teletext pages as appropriate.

This approach has certain advantages. There is ample capacity for hundreds of pages to describe items in detail on the tape and faster access to the required information can be provided than is usual with normal broadcast teletext transmissions as at any given time the teletext data base is not encumbered with data for other items which are described at other portions of the tape. It is also possible to provide all the above facilities in a multitude of languages on the same tape, the user choosing the language required. Thus a group of pages could be reserved for the English language and other groups of pages reserved for French, German and any other languages which the tape supplier desires to provide on the tape.

The above and other features and advantages of the invention will be apparent from the following description, by way of example, of embodiments of the invention with reference to the accompanying drawings, in which;

Figure 1 shows a standard broadcast teletext signal and the effect of the restricted bandwidth of a VHS recorder on this signal;

Figure 2 shows a four level code representing the broadcast teletext signal which is suitable for recording on and replay from a VHS recorder;

Figure 3 shows on an enlarged timescale a portion of the signal shown in Figure 2;

Figure 4 shows in block schematic form the recording equipment required by the media producer to produce a video tape according to the

invention;

Figure 5 shows in block schematic form playback apparatus according to the invention;

Figure 6 shows one example of a teletext page containing information from a tape according to the invention;

Figure 7 shows an example of two alternative pages;

Figure 8 is an example of a newsflash display derived from a tape according to the invention, and

Figure 9 shows an example of how a prerecorded tape may contain an interactive quiz for entertainment or education.

Figure 1 shows a standard teletext signal as received by a receiver. The data rate of the teletext signal is greater than 5 MHz and consequently such a signal will be distorted when it is fed through a video recorder, such as one according to the VHS standard which has a channel bandwidth of around 3 MHz. Figure 1b shows how the teletext signal is affected by the channel bandwidth of a typical VHS recorder. As can be seen the initial clock run-in information is lost and on replay such a signal would not be decodable by a standard teletext decoder. In order to overcome this problem our co-pending UK Patent Application No. 9605614.8 (PHB 34056) discloses the use of a multilevel code which has a data rate which is lower than that of the standard teletext data rate.

Figure 2 shows a line of teletext data encoded according to a four amplitude level code. The initial clock run-in has been replaced by a lower frequency clock run-in while the framing code and data are replaced by the four level code. The four levels in this instance are four amplitude levels and consequently in each data period two bits can be encoded, the four levels giving the codes 00, 01, 10, and 11. As a result the teletext signal re-encoded according to the multilevel code now has a data rate of half that of the standard teletext signal and now falls within the bandwidth of the VHS recorder.

Figure 3 shows the initial part of a teletext line using the multilevel code

on an expanded time scale and indicates the cycles of the clock-run in the framing code and the data. In this case the clock run-in frequency is arranged to be half that of the standard teletext clock run-in frequency.

Thus the method of recording teletext data on a tape disclosed in the above referenced patent application comprises the step of converting teletext data generated at the standard rate into a multilevel code at a data rate which is lower than that of the standard teletext signal. The multilevel code is then applied to the recording apparatus to enable the data to be recorded on the tape. In a particular embodiment a four level amplitude code is used and the data rate is half that of the standard teletext signal. If an 8 level code was used then the data rate could be reduced to one third of the standard teletext data rate since an 8 level code would allow each data period to encode three bits. Whilst it is preferred to use a multiple amplitude level code as this simplifies the recovery of data by a standard teletext decoder it is possible to use either a multilevel code comprising a number of different phases or to use a combination of phase and amplitude levels.

On replay the multilevel code is read from the tape and then converted to standard teletext data in an inverse operation to the conversion on recording. This data can then be fed into a teletext encoder to enable the teletext data to be reassembled with the video signal for transmission to an associated television receiver. The whole process of recording and replaying teletext data in this fashion using a VHS recorder is disclosed in our co-pending UK Patent Application referred to above, the contents of which are hereby incorporated by reference.

In the context of this application teletext refers not only to a system, such as World System Teletext, in which the teletext data has a binary data rate which is too high for a standard VHS recorder to record or replay but to any data which might be carried in the VBI of a television signal and which is associated with the television programme. Such data includes MHEG-5 data (MHEG is Multimedia Hypertext Experts Group) and Hypertext Mark Up Language HTML each of which may have a binary data rate which is too high

for a standard VHS recorder to record or replay. While the forgoing description with reference to Figures 1 to 3 has discussed the recording and subsequent replay or a teletext signal it will be apparent that teletext data encoded according to this procedure could be prerecorded on tapes for replay by a purchaser or renter of the tapes.

Figure 4 shows the recording equipment required by the media producer to produce a video tape according to the invention. Video material sources 1 such as video cameras, telecine machines etc. feed video signals to master video editing equipment 2. The master video editing equipment 2 will have a video controller 3 and video monitor 4 so that the media producer can edit the video material coming from the sources 1 and view the edited material.

A teletext originating system 5 having one or more editing terminals 6 receives time codes from the master video editing equipment over a line 7. The output of the teletext origination system 5 feeds a teletext data base 8. The output of the teletext data base 8 and the master video editing equipment 2 are combined in a combiner 9 which records the resulting signal on to a master tape 10. The master tape 10 is then used in replication equipment 11 to produce the tapes for distribution.

As described in Figure 4 all the elements of the recording equipment are conventional except that it is not known to record teletext data onto a video tape and consequently the feeding of time codes from the editing equipment to the teletext originating system is novel. In broadcast teletext systems the teletext signal only takes vertical and horizontal synchronising pulses from the video signal in order to ensure that it is correctly located in the vertical blanking interval. The way in which it is used enables the tape to be constructed according to the invention. That is the media producer can edit the teletext data so that the data base is dynamically updated according to the programme content on the tape.

Figure 5 shows in block schematic form playback apparatus for playing back prerecorded tapes according to the invention.

As shown in Figure 5 a prerecorded tape 50 is loaded into a video tape

recorder and the replay circuits 51 produce video and audio output signals which are fed to a video processor 52 and audio processor 53 respectively. The CVBS signal from the output of the luminance processor is fed to a first input of a multiplexer 54 and to the input of a decoder 55 which decodes the multilevel code read from the video processor during the vertical blanking interval and converts it into teletext data. This data is placed into a buffer RAM 56. A control and timing circuit 57 receives the CVBS signal from the video processor 52 and generates appropriate control and timing signals therefrom. The control and timing circuit 57 also receives control instructions from the user in conventional fashion. Appropriate timing signals for the teletext decoding are produced by the control and timing circuit 57 using the synchronising pulses derived from the CVBS signals. These timing signals are applied to the decoder 55, the buffer RAM 56 and a teletext encoder 58. The teletext encoder 58 takes the data from the buffer RAM 56 which is read from the buffer RAM 56 under the control of timing pulses from the control and timing circuit 57 and assembles them into standard teletext data packets. The output of the teletext encoder 58 is fed to a second input of the multiplexer 54. The control and timing circuit 57 switches the output of the multiplexer from the first to second inputs at the appropriate time during the vertical blanking interval. The output of the multiplexer 54 is fed either to a SCART connector or to the input of a modulator 59 which modulates the signal on to a UHF carrier and feeds it to an aerial socket. Thus above the chain dotted line in Figure 5 the components form a standard VHS video recorder except that those components within the dotted box 60 being special components for enabling the multilevel teletext code to be read from the tape and converted into standard teletext data. Our co-pending UK Patent Application No. 9605614.8 (PHB 34056), the contents of which are hereby incorporated by reference, discloses how this circuitry within the box 60 is constructed and operates.

The part of Figure 5 below the chain dotted line is a block schematic diagram of a conventional television receiver having a facility for decoding and displaying teletext pages. It comprises a tuner 61, IF stage 62, and

demodulator 63. The demodulator 63 will produce a CBVS signal which is fed to a video processor 64 and an audio signal which is fed to an audio processor 65. A teletext decoder 66 receives the CBVS signal and under the control of a control processor 67 which receives instructions from a remote control handset 68 will acquire and decode selected teletext pages. The output of the teletext decoder will normally be an RGB signal which is fed to the video processor 64 and the control processor 67 will determine whether the video signal or the decoded teletext data is fed through the video processor to the display 69. The output of the audio processor will normally be fed to a loudspeaker 70 but may also have outputs for feeding to headphones.. If the data is not in conventional teletext form but takes the form of MHEG-5 or HTML encoded data the teletext decoder will be replaced by a decoder matched to the data format recorded.

Figure 6 illustrates the situation when the page containing the synopsis of the plot so far is called up. Figure 6a shows a teletext page which is displayed on request of the plot synopsis during the replay of a detective film and the text in Figure 6a may read for example "Inspector Le Plodd has received a strange telephone call from a Miss Jinx nothing much of substance but hints of dark deeds in rural Dorset are in the air".

Figure 6b illustrates the same teletext page when called up by the viewer half way through the tape. As can be seen the plot so far page contains much more information and may read for example "Col. Blunderbuss has been found shot in the library of Doom Manor in Dorset. It might be suicide but Inspector Le Plodd is inclined to think it is murder. Many people had reason to find it useful for him to be out of the way. Possible suspects are ....." Thus as the playing of the tape continues the plot so far page can be updated so that if the viewer is interrupted during playing of the tape it is not necessary to go back to the beginning of the tape in order to refresh the viewer's memory of what has happened so far and playing of the tape from the position it had reached when the interrupted occurred can be carried out even though the interruption may last several days or even weeks.

Figure 7 illustrates different teletext pages giving the perspective of different characters in the film. Figure 7a is a synopsis of Inspector Le Plodd's view while Figure 7b is a synopsis of Miss Jinx's view.

The text in Figure 7a may read for example "I wonder what that was all about, silly girl was in a right state. No doubt a fuss about nothing. She has been reading too many detective novels, no doubt. Still better make some enquiries about Doom Manor, they seem to be a strange lot down there".

Figure 7b gives Miss Jinx's perspective and may read as follows: "Why are these policemen so stupid, can't he see what is going to happen, I don't think he listened to a word I said. I can't tell Uncle Bertie as he is probably in this too. What am I going to do?"

The views of Inspector Le Plodd, Miss Jinx and other characters in the film are each contained on different teletext pages and these teletext pages will be updated during the course of the playing of the tape in the same manner as the plot so far pages.

Figure 8 illustrates the use of the newsflash facility. As can be seen in Figure 8 the display includes the video sequence and superimposed on this in a box is some text. In this particular case the text depicts the thoughts of the speaker which are being conveyed to the viewer but not the participants in the film. As disclosed above this newsflash box can be of any desired shape and be placed in any desired position and need not be confined to the thoughts of a speaker but can include, for example messages to the viewer, or may be used to obscure particular portions of the picture if the viewer wishes to have certain clues concealed.

Figure 9 illustrates how a quiz sequence could be implemented on a video tape according to the invention. The viewer inserts a tape into the tape recorder and presses the play button. An introductory video sequence is then played, followed by instructions in video, box 90. There would be an instruction page which introduces the quiz show and gives an instruction to press the text button on the remote control handset in order to enter the quiz programme. On pressing the text key an introductory information page, box 91 is displayed.

This is arranged to remain for long enough for the viewer to read it. When sufficient time has elapsed for the viewer to read the information page the information page data is changed and the newsflash bit in the page set. No boxes are generated so under those circumstances video sequences will show and this continued until the end of the film, box 92. At the end of the newsflash bit on the information code is reset so a full text page appears, box 93. The data is changed to explain the instructions. In a particular example of a wildlife quiz on elephants the instructions may be as follows:

"Answer the questions which follow by pressing the coloured key of your choice - you have 10 seconds to answer each question - please wait for question 1."

The data in the teletext signal then changes to the first question page, box 94. This headed by the topic in this example "Elephants" and gives the first question 1. This may be for example, "Where would you expect to find elephants in the wild?" Press red for America and Asia, press green for Africa and India, press yellow for Antarctica, press blue for Australia." If a coloured key is pressed within the given time limit, for example 10 seconds, another page is selected in standard Fastext or TOP fashion, that is the coloured keys operate particular links to particular pages from the displayed page. If after the given time has elapsed no button has been pressed, the data on the page changes to the time up frame, box 97, and the page links associated with the coloured keys change to refer to the current page number, that is the time up page and consequently pressing coloured keys now has no effect.

If during the time available for pressing a coloured key the green key is pressed then the display shows that the correct answer has been selected, this page is displayed as a result of the links from the question one page, box 95. If instead the yellow button is pressed a wrong display is produced and an explanation as to why the answer is wrong is given, box 96. Again this teletext page number is selected by means of the page links from the original question page. After a time which is sufficiently long for the viewer to read and understand the response to the answers given the next question is presented,

box 98. There is of course only one version of the next question and which ever of the displays has been branched to in response to the selection of a button for pressing or the failure to press a button within the given time the same question two will be presented. Again in response to the presentation of question two the viewer is invited to press an appropriate button within the given time and the procedure as described with respect to the first question is followed for the second and any subsequent questions. A memory may be provided to enable the number of correct answers to be recorded and a tally made at the end of the quiz to enable the viewer to judge the performance.

There are of course many different possibilities for using the technique of dynamically updating the teletext data along the length of a tape and the present application has only given a selected number of examples of the possible use of this facility.

From reading the present disclosure, other modifications will be apparent to persons skilled in the art. Such modifications may involve other features which are already known in the design and use of video tapes and video tape recorders and component parts thereof and which may be used instead of or in addition to features already described herein. Although claims have been formulated in this application to particular combinations of features, it should be understood that the scope of the disclosure of the present application also includes any novel feature or any novel combination of features disclosed herein either explicitly or implicitly or any generalisation of one or more of those features which would be obvious to persons skilled in the art, whether or not it relates to the same invention as presently claimed in any claim and whether or not it mitigates any or all of the same technical problems as does the present invention. The applicants hereby give notice that new claims may be formulated to such features and/or combinations of such features during the prosecution of the present application or of any further application derived therefrom.

CLAIMS

1. A VHS video tape carrying thereon teletext data multiplexed with a video signal, the teletext data being encoded into a multilevel code having a data rate less than that of a standard broadcast teletext signal and within the bandwidth of a VHS standard video recorder, in which the teletext data is relevant to the video material on the tape and on a given page is updated along the length of the tape.

2. A video tape as claimed in Claim 1 in which a plurality of teletext pages are provided each carrying data relevant to different characters in a video programme.

3. A VHS video tape as claimed in Claim 1 in which the teletext data is MHEG-5 encoded data.

4. A VHS video tape as claimed in Claim 1 in which the teletext data is HTML encoded data.

FIG. 1a

FIG. 1b

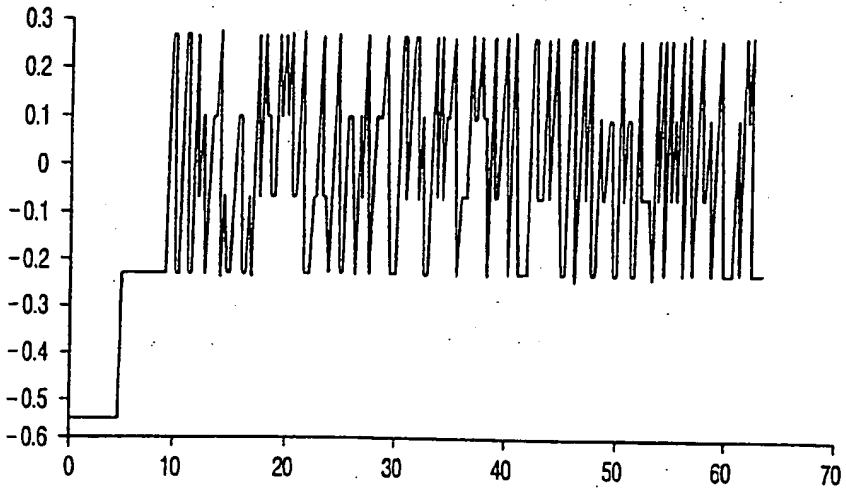
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
0
10
20
30
40
50
60
70

FIG. 2

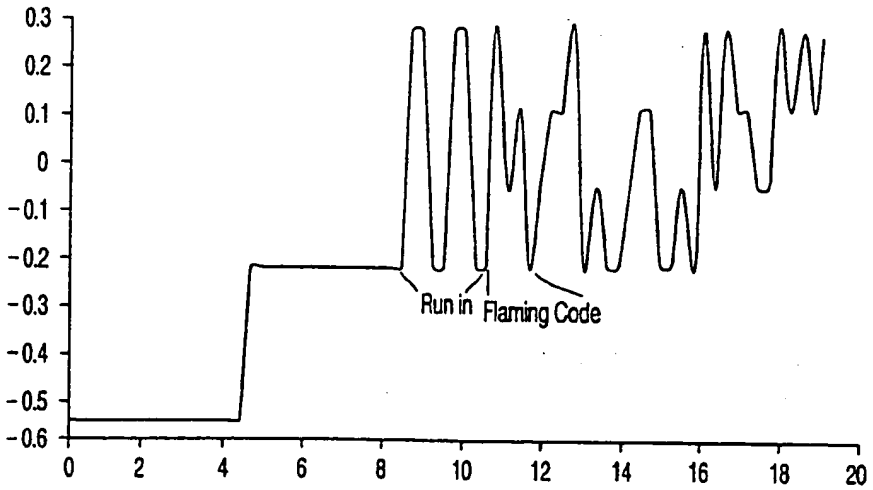
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
0
2
4
6
8
10
12
14
16
18
20
Run in
Flaming Code

FIG. 3

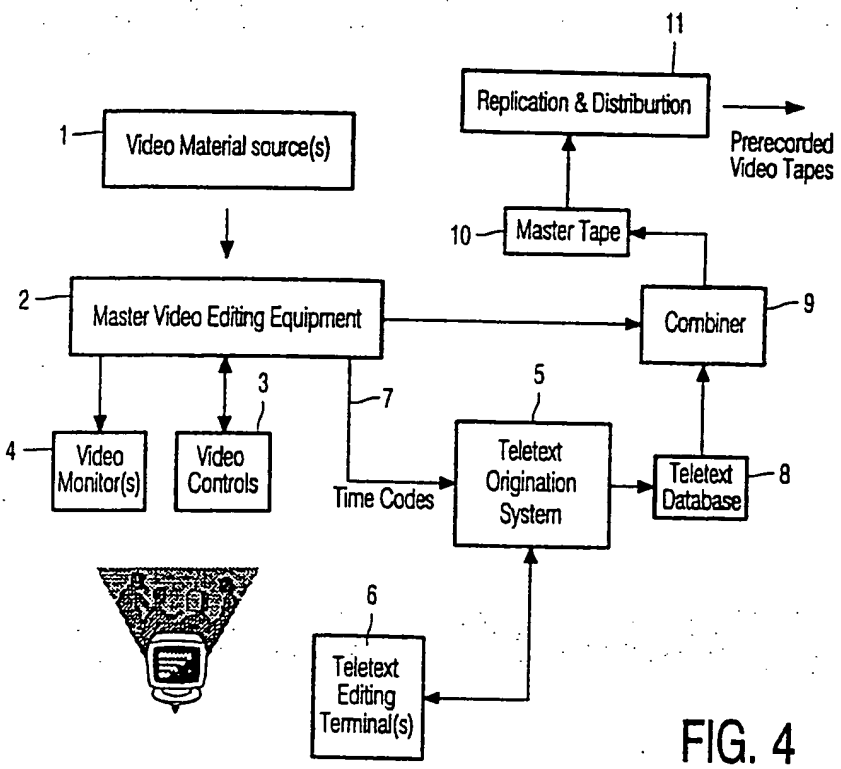
11
Replication & Distribution
Prerecorded Video Tapes
1
Video Material source(s)
10
Master Tape
2
Master Video Editing Equipment
Combiner
9
3
7
5
4
Video Monitor(s)
Video Controls
Time Codes
Teletext Origination System
Teletext Database
8
6
Teletext Editing Terminal(s)

FIG. 4

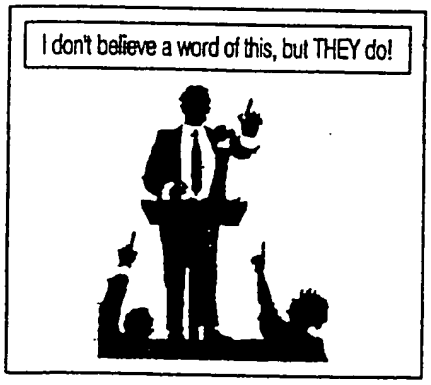
I don't believe a word of this, but THEY do!

FIG. 8

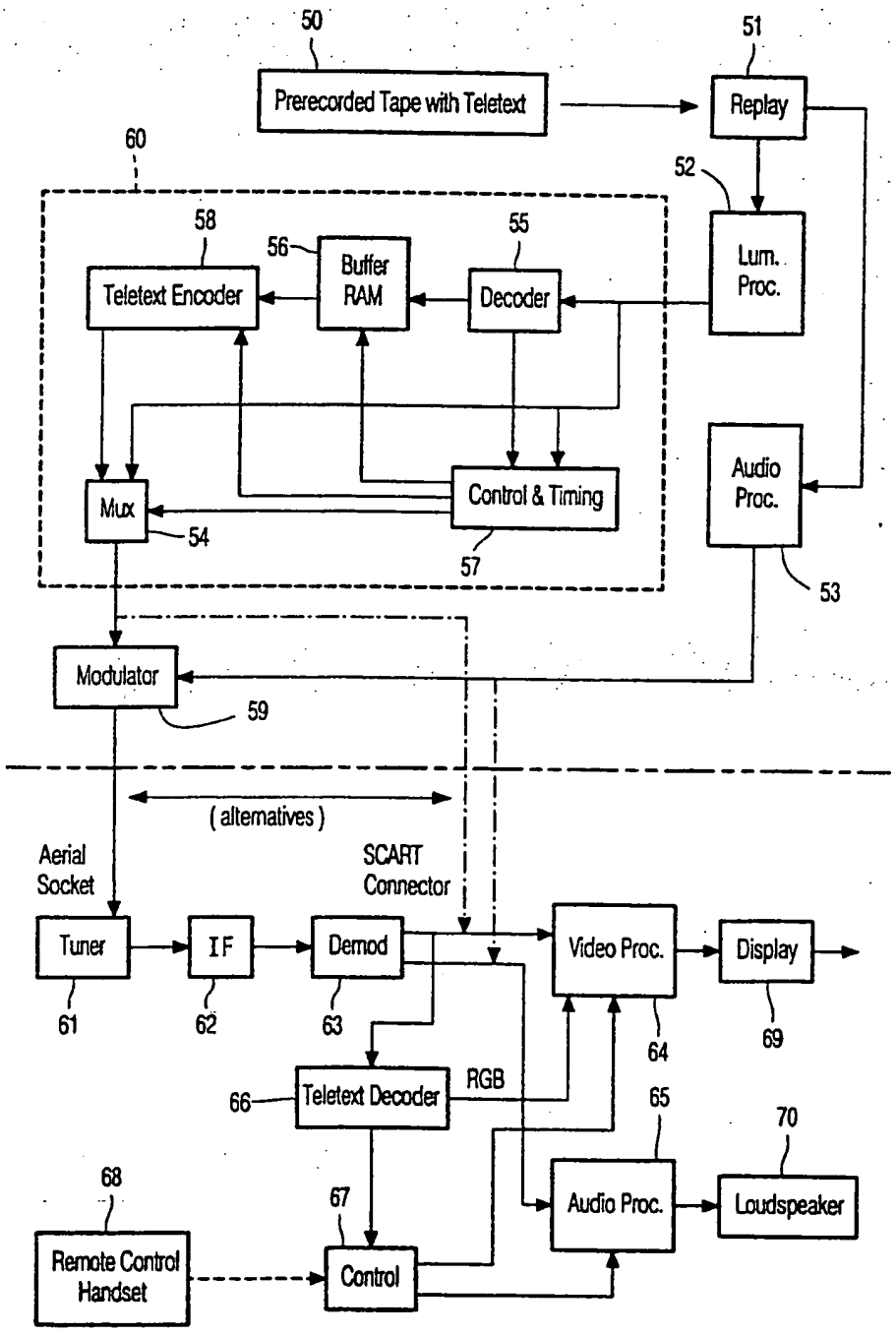
50
Prerecorded Tape with Teletext
51
Replay
60
52
58
56
Buffer RAM
55
Teletext Encoder
Decoder
Lum. Proc.
Audio Proc.
Mux
54
Control & Timing
57
53
Modulator
59
(alternatives)
Aerial Socket
SCART Connector
Tuner
IF
Demod
Video Proc.
Display
61
62
63
64
69
66
Teletext Decoder
RGB
65
70
68
67
Audio Proc.
Loudspeaker
Remote Control Handset
Control

FIG. 5

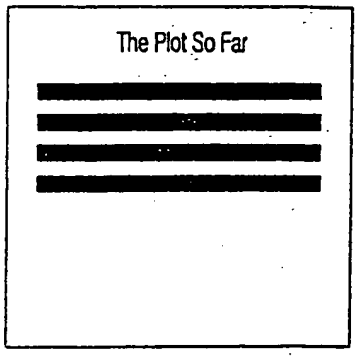

FIG. 6a

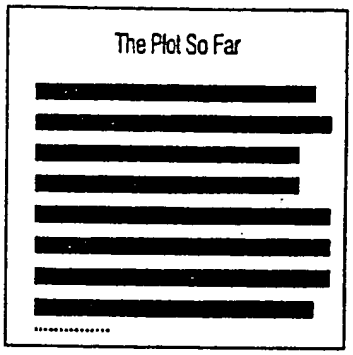

FIG. 6b

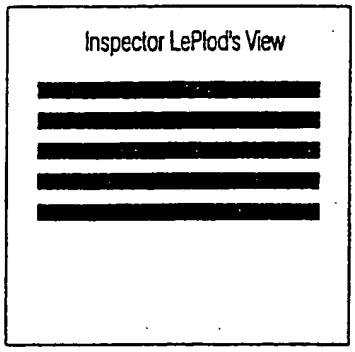

FIG. 7a

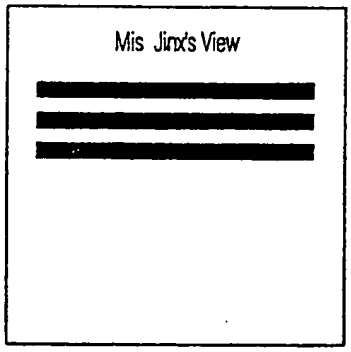

FIG. 7b

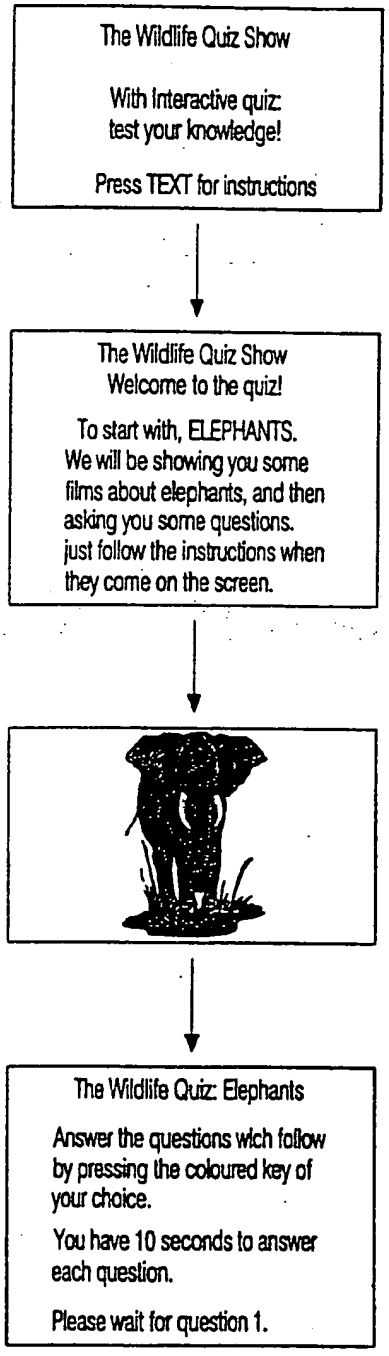
The Wildlife Quiz Show
With Interactive quiz:
test your knowledge!
Press TEXT for instructions
The Wildlife Quiz Show
Welcome to the quiz!
To start with, ELEPHANTS.
We will be showing you some films about elephants, and then asking you some questions.
just follow the instructions when they come on the screen.
The Wildlife Quiz: Elephants
Answer the questions wich follow by pressing the coloured key of your choice.
You have 10 seconds to answer each question.
Please wait for question 1.

FIG. 9a

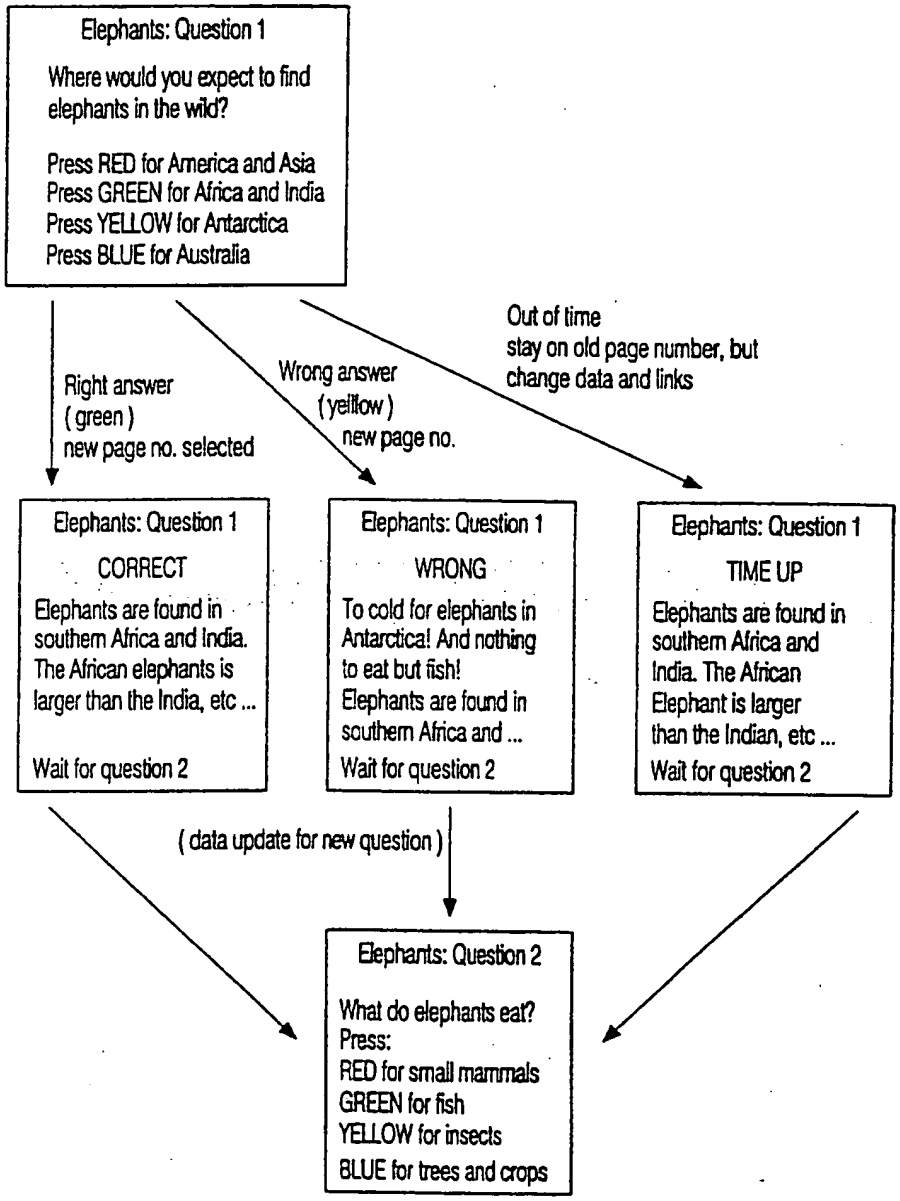
Elephants: Question 1
Where would you expect to find elephants in the wild?
Press RED for America and Asia
Press GREEN for Africa and India
Press YELLOW for Antarctica
Press BLUE for Australia
Right answer (green) new page no. selected
Wrong answer (yellow) new page no.
Out of time stay on old page number, but change data and links
Elephants: Question 1
CORRECT
Elephants are found in southern Africa and India. The African elephants is larger than the India, etc ...
Wait for question 2
Elephants: Question 1
WRONG
To cold for elephants in Antarctica! And nothing to eat but fish!
Elephants are found in southern Africa and ...
Wait for question 2
Elephants: Question 1
TIME UP
Elephants are found in southern Africa and India. The African Elephant is larger than the Indian, etc ...
Wait for question 2
(data update for new question)
Elephants: Question 2
What do elephants eat?
Press:
RED for small mammals
GREEN for fish
YELLOW for insects
BLUE for trees and crops

FIG. 9b

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